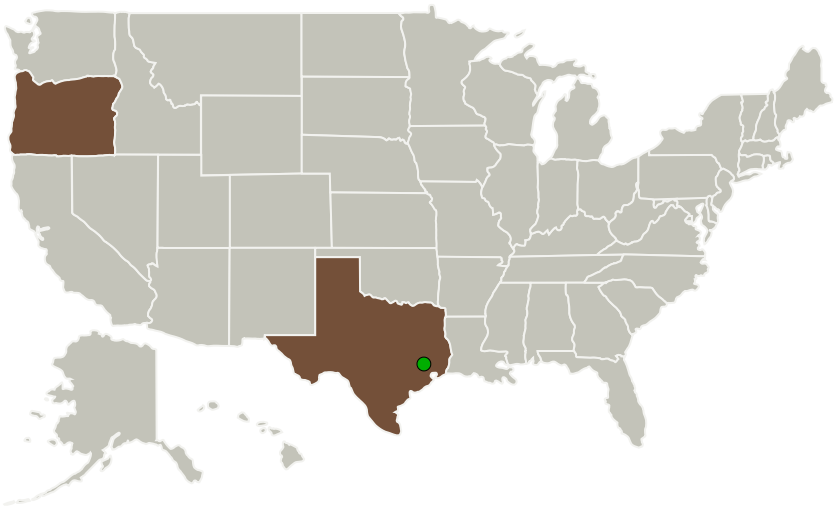
Passive Collapsible Contingency Urinal for Human Spaceflight, Phase II

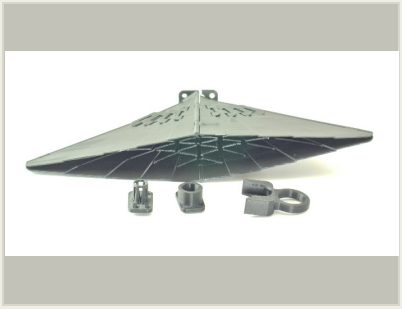
Completed Technology Project (2014 - 2016)

Project Introduction

Acute challenges are faced by the designers of fluid transport systems for spacecraft because of the persistently unfamiliar and unforgiving low-g environment. However, with modern design tools capillarity can used to passively perform critical life support functions, increasing reliability, while enabling new device functionality. Such systems are directly tied to critical life support systems: i.e., oxygen supply, air revitalization, thermal management systems, water reclamation, medical fluids, and others. In this work IRPI will apply the Phase I design process toward the development of a much needed contingency waste water collection and processing device for human spaceflight. The device provides passive liquid collection, containment, bubble separation, and droplet coalescence functions for contingency urine collection in a lightweight, low volume, low cost, and potentially disposable device that may be used for subsequent sampling, metering, storage, disposal, and/or re-use. Our approach will include "fractal wetting" and design that incorporates "smart" capillary fluidics. Though the work is focused on a single application, the design approach and capabilities have a broad impact on capillary-based fluids management aboard spacecraft and on earth.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Irpi, LLC	Lead Organization	Industry	Wilsonville, Oregon
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Oregon	Texas

Project Transitions

April 2014: Project Start

April 2016: Closed out

Closeout Summary: Passive Collapsible Contingency Urinal for Human Spaceflight, Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/137446)*

Images

Briefing Chart Image
Passive Collapsible Contingency Urinal for Human Spaceflight, Phase II
(https://techport.nasa.gov/image/136246)

Final Summary Chart Image
Passive Collapsible Contingency Urinal for Human Spaceflight, Phase II Project Image
(https://techport.nasa.gov/image/129585)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Irpi, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

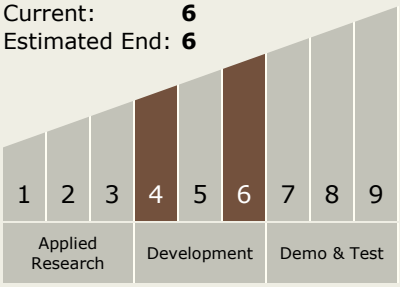
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Ryan Jenson

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.3 Waste Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System